

WHAT IS CLAIMED IS:

1 1. In a wireless telecommunications system having a
2 Base Transceiver Station (BTS) and a mobile terminal equipped
3 with a Global Positioning System (GPS) equipped receiver, the
4 Base Transceiver Station having operational control of the
5 GPS-equipped mobile terminal, a method for determining the
6 approximate position of the GPS-equipped mobile terminal,
7 said method comprising the steps of:
8 demodulating signals received from a multiplicity
9 of GPS satellites at a reference GPS receiver, said reference
10 GPS receiver being connected to the wireless
11 telecommunications system and having a determinate physical
12 location relative to the Base Transceiver Station;
13 recovering respective navigational data signals
14 from each of said demodulated GPS signals;
15 originating a request for approximate navigational
16 information from the GPS-equipped mobile terminal to the Base
17 Transceiver Station;
18 transmitting recovered navigational data signals
19 to the GPS-equipped mobile terminal responsive to said
20 request for approximate navigational information; and

1 2. The method according to Claim 1, wherein said
2 signals from the GPS satellites are Standard Positioning
3 Service (SPS) signals received on an L1 frequency, said L1
4 frequency being centered at about 1575.42 MHz.

1 3. The method according to Claim 1, wherein said
2 signals from the GPS satellites are Precise Positioning
3 Service (PPS) signals received on an L2 frequency, said L2
4 frequency being centered at about 1227.60 MHz.

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1 5. The method according to Claim 1, wherein said step
2 of originating said request for approximate locational
3 information from the GPS-equipped mobile terminal to the Base
4 Transceiver Station is responsive to activation of the mobile
5 terminal.

1 6. The method according to Claim 1, wherein said step
2 of originating said request for approximate locational
3 information from the GPS-equipped mobile terminal to the Base
4 Transceiver Station is responsive to placing a call from the
5 GPS-equipped mobile terminal to one of a set of designated
6 numbers.

1 7. The method according to Claim 6, wherein said one
2 designated number is associated with an emergency service.

1 8. The method according to Claim 1, wherein said step
2 of originating said request for approximate locational
3 information from the GPS-equipped mobile terminal to the Base
4 Transceiver Station is responsive to a determination by the
5 reference GPS receiver that the GPS signal strength at the
6 GPS-equipped mobile terminal is inadequate to permit

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7 initialization of the reference GPS receiver associated with
8 the GPS-equipped mobile terminal within a desired response
9 time.

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1 9. The method according to Claim 1, wherein said step
2 of transmitting is performed as a Cell Broadcast (CB) Short
3 Message Service (SMS) message of the wireless
4 telecommunications system.

1 10. The method according to Claim 1, wherein said step
2 of transmitting is performed over a Broadcast Control Channel
3 (BCCH) of the wireless telecommunications system.

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1 11. The method according to Claim 1, further comprising
2 the step of:
3 periodically transmitting a Timing Advance
4 parameter from the Base Transceiver Station to the GPS-
5 equipped mobile terminal to dynamically compensate for
6 varying distances between the GPS-equipped mobile terminal
7 and the Base Transceiver Station.

1 12. The method according to Claim 11, further
2 comprising the step of:

3 refining said approximate location of the GPS-
4 equipped mobile terminal using said Timing Advance parameter.

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13. In a wireless telecommunications system having a
2 Base Transceiver Station and a mobile terminal equipped with
3 a Global Positioning System (GPS) receiver, the Base
4 Transceiver Station having operational control of the GPS-
5 equipped mobile terminal, a method for determining the
6 approximate position of the GPS-equipped mobile terminal,
7 said method comprising the steps of:

8 demodulating signals received from a multiplicity
9 of GPS satellites at a reference GPS receiver, said reference
10 GPS receiver being connected to the wireless
11 telecommunications system and having a determinate physical
12 location relative to the Base Transceiver Station;

13 computing an estimated location of said reference
14 GPS receiver using said demodulated signals from said GPS
15 satellites;

16 originating a request for approximate locational
17 information from the GPS-equipped mobile terminal to the Base
18 Transceiver Station;

19 transmitting said estimated location of said
20 reference GPS receiver from the Base Transceiver Station to
21 the GPS-equipped mobile terminal responsive to said request
22 for approximate locational information; and

23 determining, from said transmitted location of said
24 reference GPS receiver, the approximate location of the GPS-
25 equipped mobile terminal.

1 14. The method according to Claim 13, wherein said step
2 of computing the estimated location of said reference GPS
3 receiver further comprises the steps of:

4 recovering respective navigational data signals
5 from each of said demodulated GPS signals from said GPS
6 satellites; and

7 computing, from the respective navigational data
8 signals, the location of said reference GPS receiver.

1 15. The method according to Claim 14, wherein said
2 respective navigational data signals comprise orbital

3 parameters associated with a plurality of GPS satellites,
4 clock correction information and differential correction
5 information.

1 16. The method according to Claim 13, wherein said
2 method further comprises, after said step of computing and
3 before said step of originating, the step of:

4 storing said estimated location of said reference
5 GPS receiver in said wireless telecommunications system.

1 17. The method according to Claim 13, wherein said step
2 of originating said request for approximate locational
3 information from the GPS-equipped mobile terminal to the Base
4 Transceiver Station is responsive to activation of the GPS-
5 equipped mobile terminal.

1 18. The method according to Claim 13, wherein said step
2 of originating said request for approximate locational
3 information from the GPS-equipped mobile terminal to the Base
4 Transceiver Station is responsive to placing a call from the
5 GPS-equipped mobile terminal to one of a set of designated
6 numbers.

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1 19. The method according to Claim 18, wherein said one
2 designated number is associated with an emergency service.

1 20. The method according to Claim 13, wherein said step
2 of originating said request for approximate locational
3 information from the GPS-equipped mobile terminal to the Base
4 Transceiver Station is responsive to a determination by the
5 reference GPS receiver that GPS signal strength at the GPS-
6 equipped mobile terminal is inadequate to permit
7 initialization of the reference GPS receiver associated with
8 the GPS-equipped mobile terminal within a desired response
9 time.

1 21. The method according to Claim 13, wherein said step
2 of transmitting is performed as a Cell Broadcast (CB) Short
3 Message Service (SMS) message over the wireless
4 telecommunications system.

1 22. The method according to Claim 13, wherein said step
2 of transmitting is performed over a Broadcast Control Channel
3 (BCCH) of the wireless telecommunications system..

24. In a wireless telecommunications system having a Base Transceiver Station and a mobile terminal equipped with a Global Positioning System (GPS) receiver, the Base Transceiver Station having operational control of the GPS-equipped mobile terminal, a system for determining the approximate position of the GPS-equipped mobile terminal, said system comprising:

14 signal recovery means for recovering navigational
15 data signals from each of said demodulated signals from said
16 GPS satellites;

17 requesting means for requesting approximate
18 navigational information for the GPS-equipped mobile terminal
19 from the Base Transceiver Station;

20 transmission means for transmitting said recovered
21 navigational data signals to the GPS-equipped mobile terminal
22 responsive to said request for approximate navigational
23 information; and

24 determination means for determining, from said
25 transmitted navigational data signals to determine the
26 approximate location of the GPS-equipped mobile terminal.

1 25. The system according to Claim 24, wherein said
2 signals from the GPS satellites are Standard Positioning
3 Service (SPS) signals received on an L1 frequency, said L1
4 frequency being centered at about 1575.42 MHz.

1 26. The system according to Claim 24, wherein said
2 signals from the GPS satellites are Precise Positioning
3 Service (PPS) signals received on an L2 frequency, said L2
4 frequency being centered at about 1227.60 MHz.

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1 27. The system according to Claim 24, wherein said
2 approximate navigational information comprises the identities
3 of a plurality of GPS satellites within ranging distance, the
4 orbital parameters associated with said plurality of GPS
5 satellites, clock correction information and differential
6 correction information associated with said plurality of GPS
7 satellites.

1 28. The system according to Claim 24, wherein said
2 requesting means is responsive to activation of the mobile
3 terminal.

1 29. The system according to Claim 24, wherein said
2 requesting means is responsive to placing a call from the
3 GPS-equipped mobile terminal to one of a set of designated
4 numbers.

1 30. The system according to Claim 24, wherein said one
2 designated number is associated with an emergency service.

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3 31. The system according to Claim 24, wherein said
4 requesting means is responsive to a determination by the
5 reference GPS receiver that GPS signal strength at the GPS-
6 equipped mobile terminal is inadequate to permit the
7 initialization of the reference GPS receiver associated with
8 the GPS-equipped mobile terminal within a desired response
9 time.

1 32. The system according to Claim 24, wherein said
2 transmission means comprises a Cell Broadcast (CB) Short
3 Message Service (SMS) message over the wireless
4 telecommunications system.

1 33. The system according to Claim 24, wherein said
2 transmission means comprises a Broadcast Control Channel
3 (BCCH) of the wireless telecommunications system.

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1 34. The system according to Claim 24, further
2 comprising:

3 means for periodically transmitting a Timing
4 Advance parameter from the Base Transceiver Station to the
5 GPS-equipped mobile terminal to dynamically compensate for

6 varying distances between the GPS-equipped mobile terminal
7 and the Base Transceiver Station.

1 35. The system according to Claim 34, further
2 comprising:

3 means for refining said approximate location of the
4 GPS-equipped mobile terminal using said Timing Advance
5 parameter.

1 36. In a wireless telecommunications system having a
2 Base Transceiver Station and a mobile terminal equipped with
3 a Global Positioning System (GPS) receiver, the Base
4 Transceiver Station having operational control of the GPS-
5 equipped mobile terminal, a system for determining the
6 approximate position of the GPS-equipped mobile terminal,
7 said system comprising:

8 a demodulator for demodulating signals received
9 from a multiplicity of GPS satellites at a reference GPS
10 receiver, said reference GPS receiver being connected to the
11 wireless telecommunications system and having a determinate
12 physical location relative to the Base Transceiver Station;

13 computing means for determining an estimated
14 location of said reference GPS receiver using said
15 demodulated signals from said GPS satellites;
16 requesting means for requesting approximate
17 locational information from the GPS-equipped mobile terminal
18 to the Base Transceiver Station;
19 a transmitter for transmitting the location of said
20 reference GPS receiver from the Base Transceiver Station to
21 the GPS-equipped mobile terminal responsive to said request
22 for said approximate locational information; and
23 determination means for determining the approximate
24 location of the GPS-equipped mobile terminal using said
25 transmitted location of said reference GPS receiver.

1 37. The system according to Claim 36, wherein said
2 computing means further comprises:

3 decoder means for recovering respective
4 navigational data signals from each of said demodulated
5 signals from said GPS satellites; and

6 computing means for computing the location of said
7 reference GPS receiver from said respective navigational data
8 signals.

1 41. The system according to Claim 36, wherein said
2 requesting means is responsive to placing a call from the
3 GPS-equipped mobile terminal to one of a set of designated
4 numbers.

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1 42. The system according to Claim 41, wherein said one
2 designated number is associated with an emergency service.

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1 43. The system according to Claim 36, wherein said
2 requesting means is responsive to a determination by the
3 reference GPS receiver that GPS signal strength at the GPS-
4 equipped mobile terminal is inadequate to permit
5 initialization of the reference GPS receiver associated with
6 the GPS-equipped mobile terminal within a desired response
7 time.

1 44. The system according to Claim 36, wherein said
2 transmitter transmits a Cell Broadcast (CB) Short Message
3 Service (SMS) message over the wireless telecommunications
4 system.

1 45. The system according to Claim 36, wherein said
2 transmitter transmits over a Broadcast Control Channel (BCCH)
3 of the wireless telecommunications system.

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1 46. The system according to Claim 36, wherein the
2 estimated location of said reference GPS receiver is used as
3 the approximate location of the GPS-equipped mobile terminal.

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